Community Salmon Investigations for Highline

CSI: Highline

8th Annual Orientation & Training Workshop

October 5, 2017

Matt Goehring
Miller-Walker Basin Steward, King County

Agenda

- Introductions
- Why Count & Cut Open Salmon?
- Survey Protocol
- Observing & Reporting Pre-Spawn Mortality
- Salmon identification – tips & practice
- Carcass Necropsy
- Teams & Scheduling, turn in waivers
- Equipment Distribution

Miller Walker Basin Stewardship Program

- Jointly funded
- Improve basin conditions

Burien | City of Normandy Park Washington | City of SeaTac | King County | Port of Seattle

Miller-Walker Basin Local partners working together for clean water and healthy streams

Why CSI?

- Estimate salmon escapement
- Assess pre-spawn mortality
- Raise community awareness

Basin Monitoring Coordination Workshops, Fall 2008

Salmon Life Cycle

Photo by Hans Berge

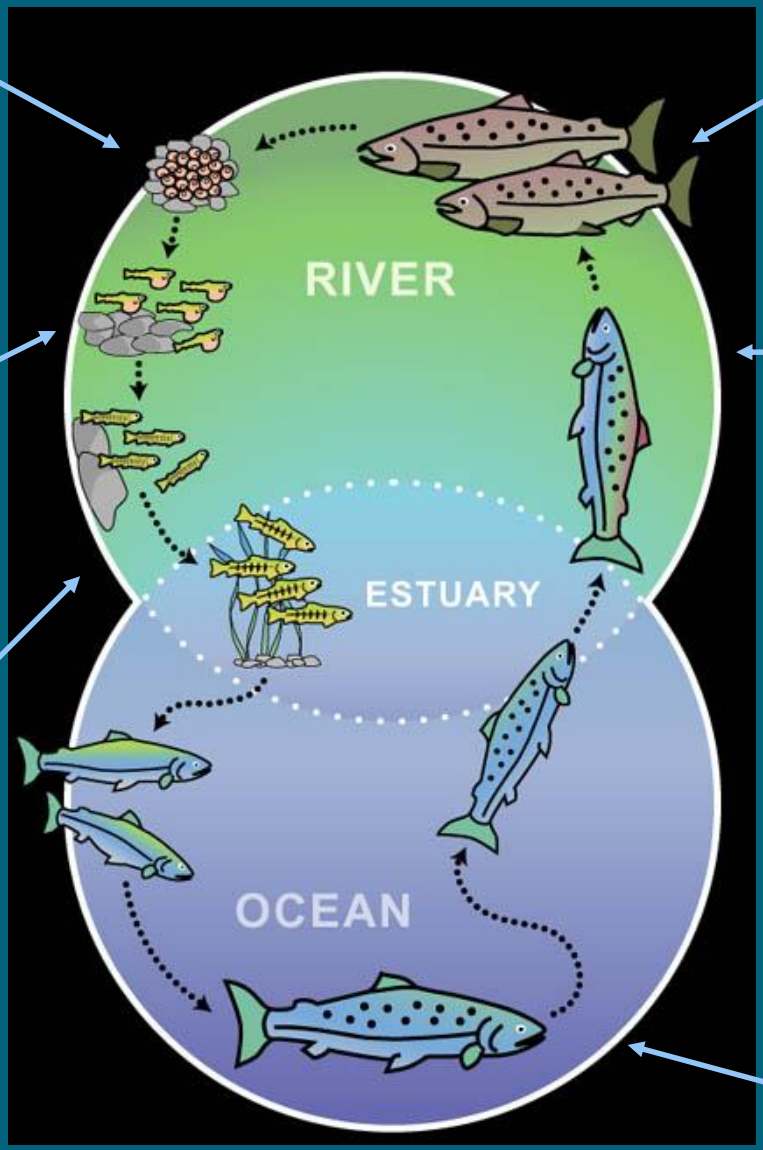
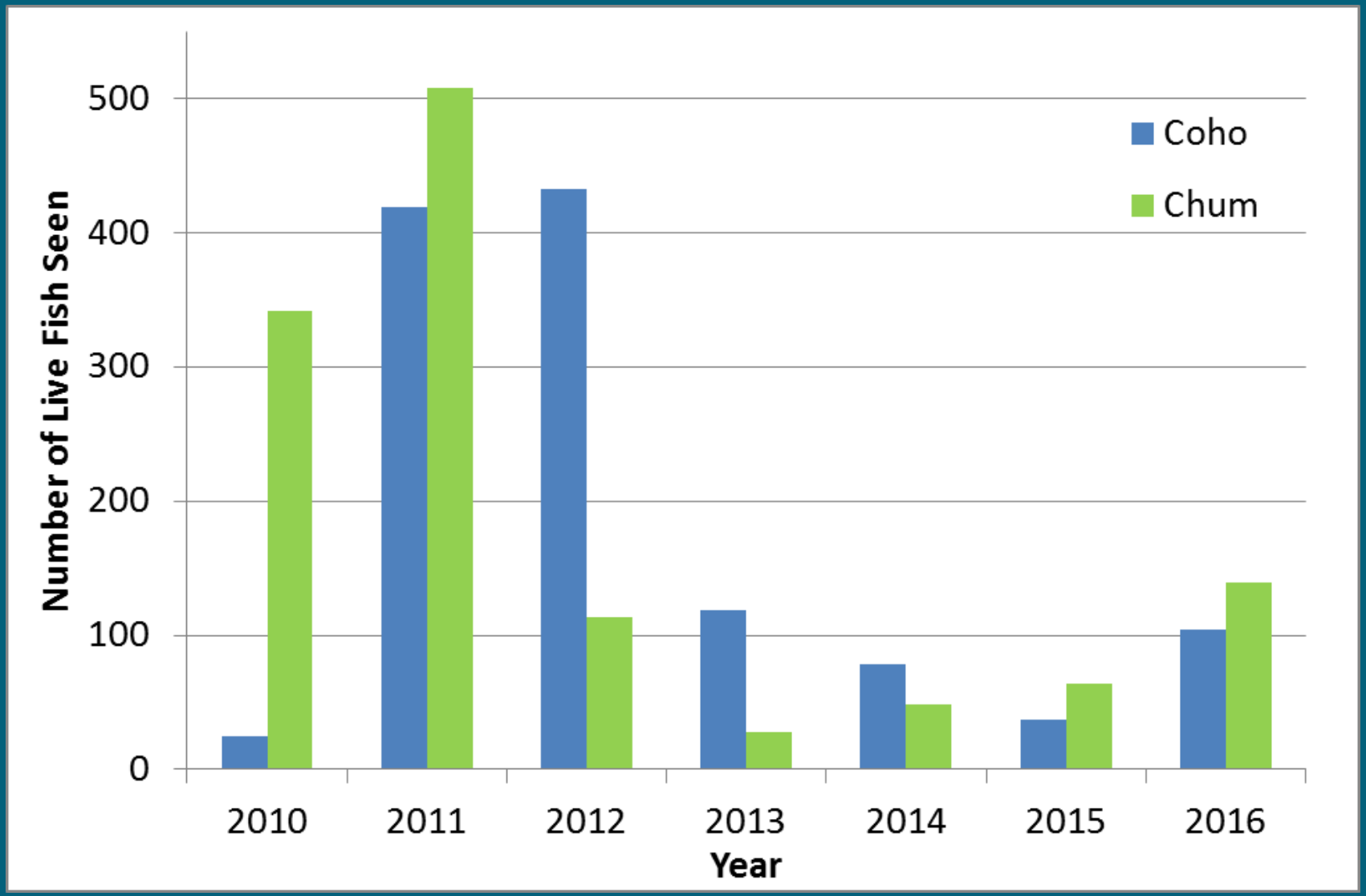
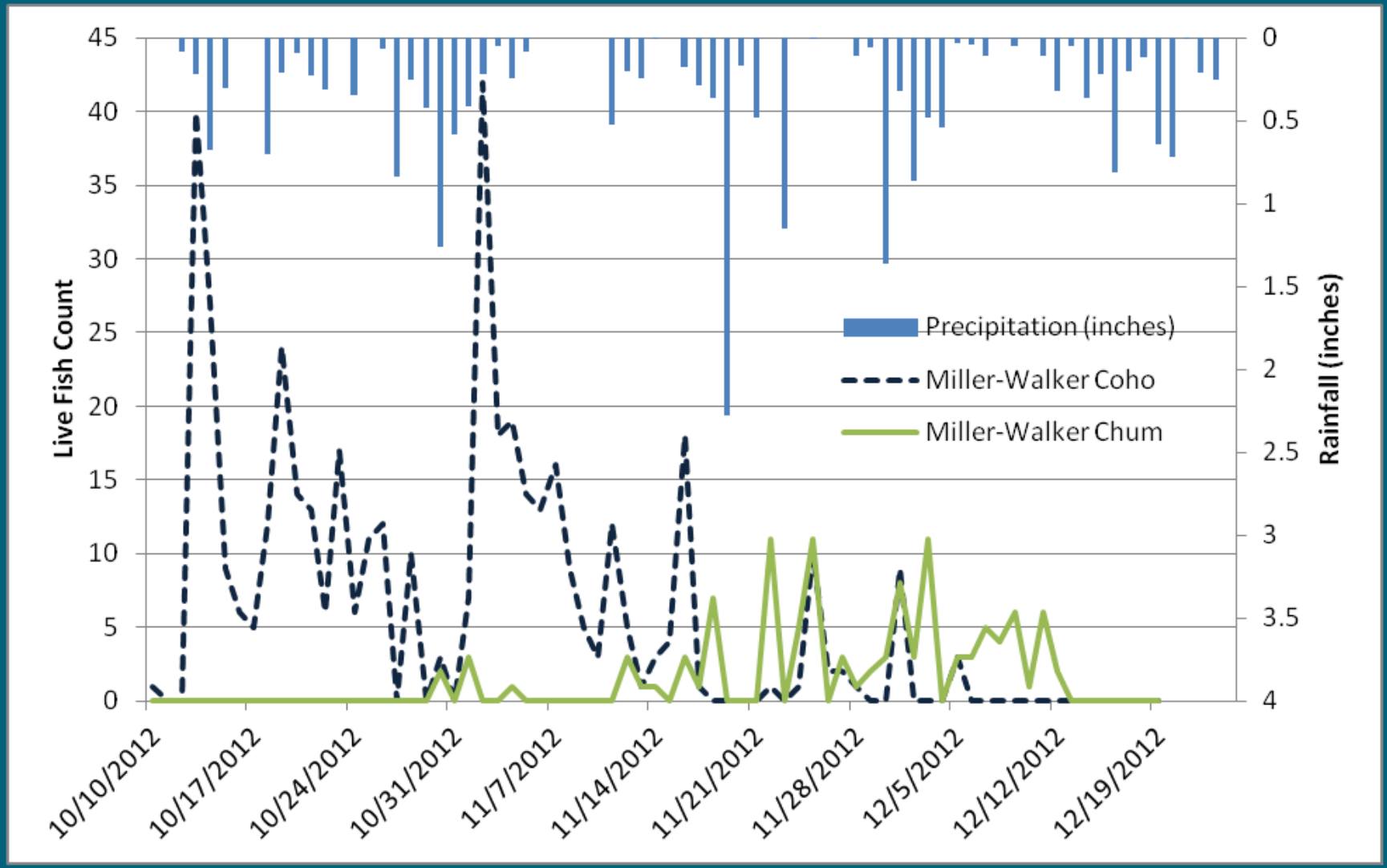


Photo by Al Solonsky

Results: 2010-2016 Sightings



Rainfall and live fish - 2012



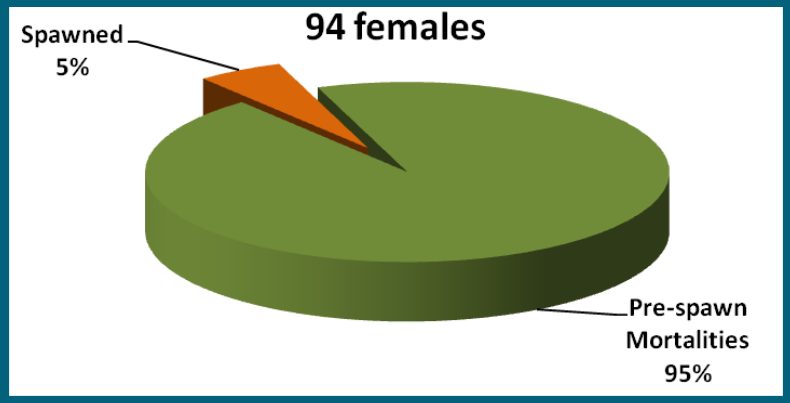
Stormwater

Pre-spawn Mortality

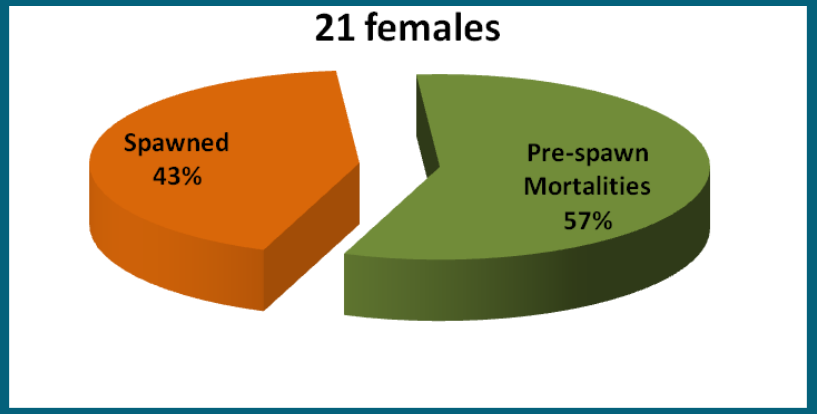
Longfellow Creek, Puget Soundkeeper Alliance

Coho: Spawning Success in 2012:

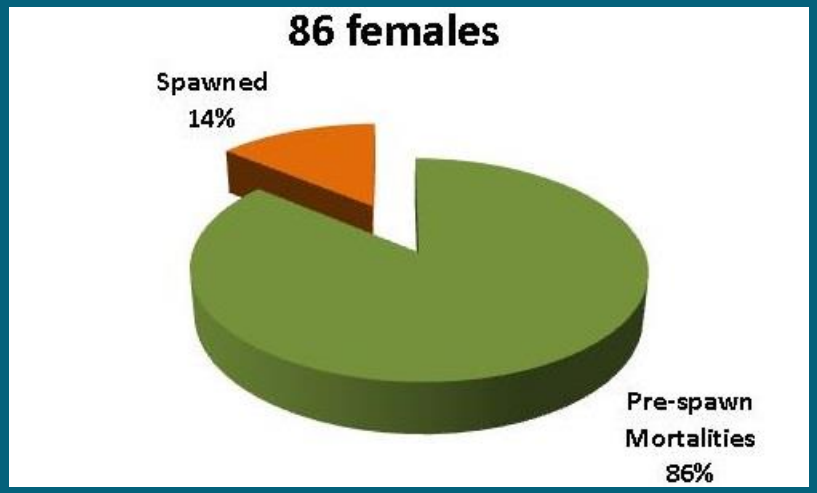
Miller Creek- 95% PSM



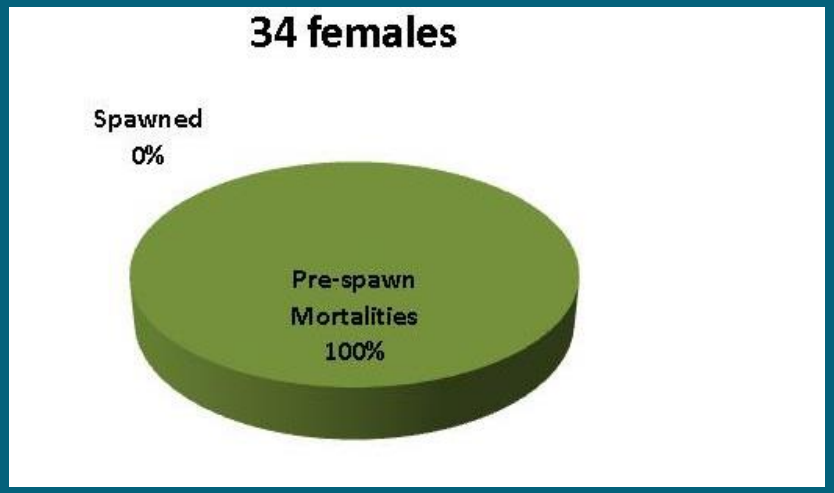
Walker Creek – 57% PSM



Longfellow Creek – 86% PSM



Des Moines – 100% PSM



Survey Protocol

"Team Thursday" Brenda surveying
Lower Miller Creek
October 16, 2014

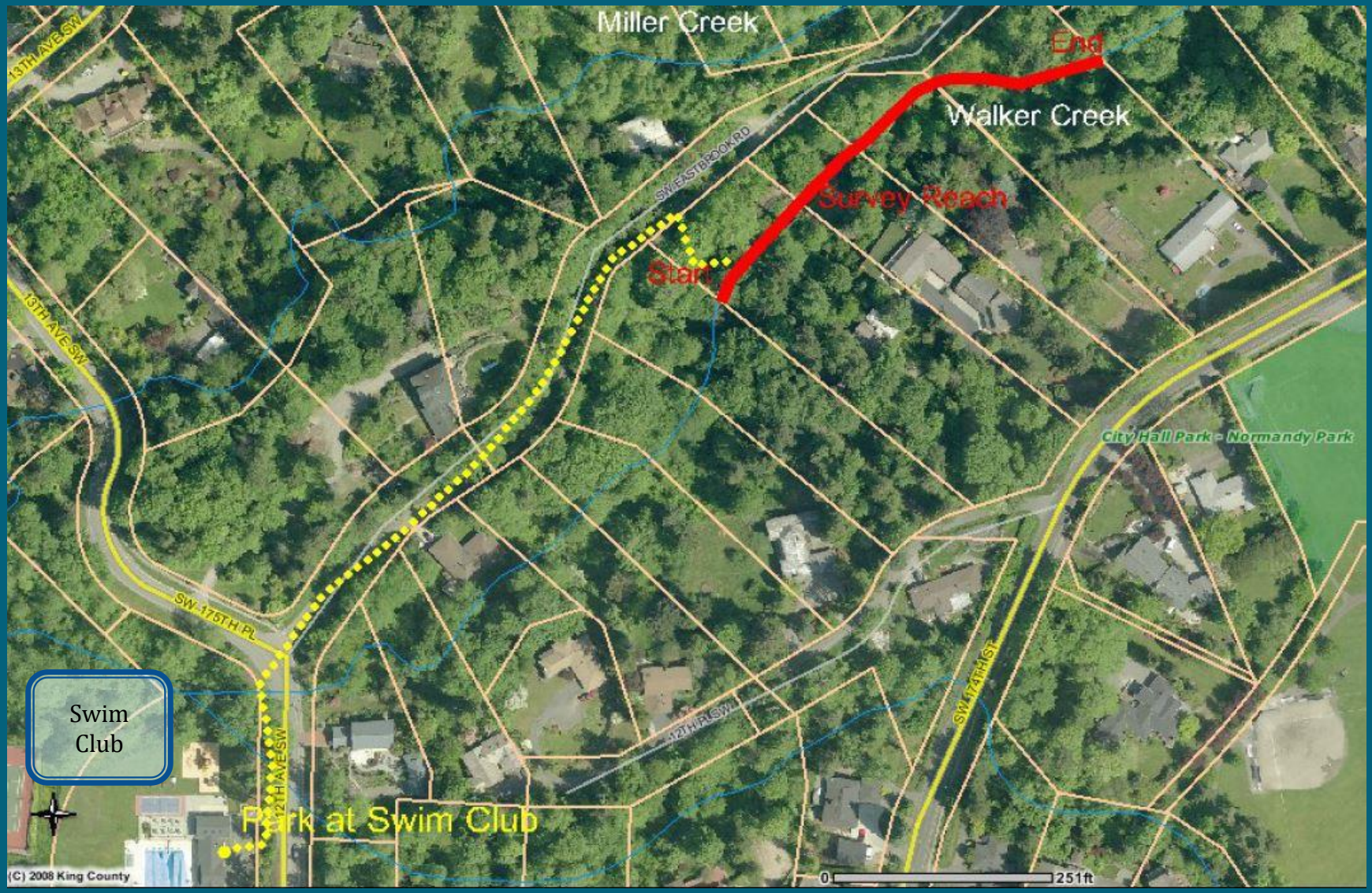
CSI: Highline – When

- When do we start surveys?
  - Sunday, October 8
- How often do we survey?
  - EVERY DAY (unless it is bad weather)
  - Teams survey once/week or every other week
- When do we stop surveys?
  - 5 days after last fish seen (~late December)

Where? Miller and Walker Creek

Lower Miller & Walker Surveys

Upper Walker Creek Survey



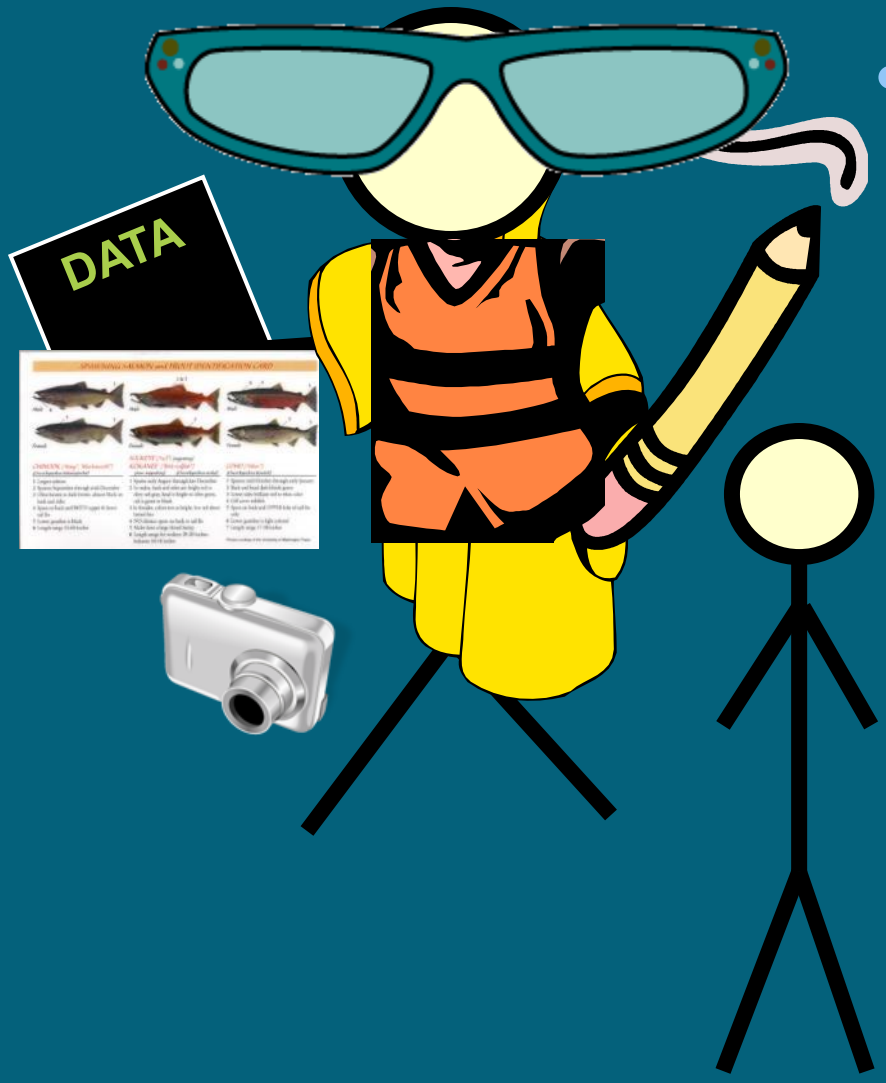
Upper Miller Creek Survey

Upper Miller Survey (weekend access)

Survey Tips

- Teams of two
- Survey Upstream
- 15 ft. spacing
- Stay out of stream when possible
- Avoid redds and native plants
- Pick up garbage

What To Bring



- Data sheets
- Car ID sheet for dash
- Lock combo & phone numbers
- Salmon ID materials
- Digital Camera /mobile
- Pencils NO pens, please!
- Polarized glasses
- Raingear & waders
- A Buddy! (for fun & safety)
- Orange vest (for safety)
- Walking stick
- Necropsy Kit

CSI *Style*

Polarized sunglasses for fish spotting

Bag for supplies

Kay modeling survey attire on Miller Creek

Photo courtesy of Pam Silimperi

Rain gear and layered clothing

Safety vest for visibility and identification as CSI

Data forms and phone numbers

Trekking pole for stability and flushing fish

Chest waders for extra warmth and deep water

Safety First

- **ALWAYS THINK!** Surveying is not worth risking life or limb over.
- **ALWAYS survey with a partner.** Go with the more "conservative" course of action.
- **Do NOT survey when water is flowing fast and deep** – if you can't see into the water, it is probably too fast/deep for you to survey safely).
- **Do NOT survey during windy conditions** because of falling tree branches.

Be aware of and avoid hazards

- Slipping on mud, vegetation and wet rocks
- Unstable footing as logs or rocks roll
- Poke in the eye from branches
- Stinging nettles, blackberries
- Cuts from knife/gutting tool
- Hypothermia from getting wet and cold
- Bee stings – especially if allergic

Stop surveying if anyone is hurt, wet or too cold

Emergency Procedures

- **Emergency, call 911**

- **Nearest Emergency Room:**

  Highline Medical Center
  16251 Sylvester Rd SW
  Burien, WA 98166
  (206) 431-5314

Keeping Invasive Species Out

- Disinfect boots used in other creeks:
  - Brush off all visible dirt
  - Dry completely
  - No felt soles
  - 5 minutes in water over 140 degrees
  - Freeze overnight

- King County web page on New Zealand Mud Snails

Data Collection

- Live Fish:
  - Species (coho/chum)
  - Number
- Redds
  - Number
  - Location
- Carcasses
  - Species/Sex
  - Measurements
  - PSM

Recording Data

Daily Survey Sheet - Community Salmon Investigation (CSI) for Highline

Date: 10/3/17 Team Members: Matt Goehring / Elissa Ostergaard

Site: Miller and Walker Creeks (circle one or both)

Start Time 9:00am End Time 12:30pm Weather: X Sunny ___Cloudy ___Rainy Tide: ___High X Medium ___Low

Live Adult Fish — Clint and Catherine Adams: c 206-818-6793

Location	Coho	Chum	Other Adult Fish (record here if not 100% sure of species ID)	Notes: Which reach surveyed, adult and juvenile fish, wildlife, flow volume, water clarity, presence/absence of foam
Lower Miller	3	0	1	flow too high to wade lower section
Lower Walker	1	0	0	
Upper Walker	2	1	0	
Upper Miller	0	0	0	foam observed in stream

Notes (for overall survey): _____

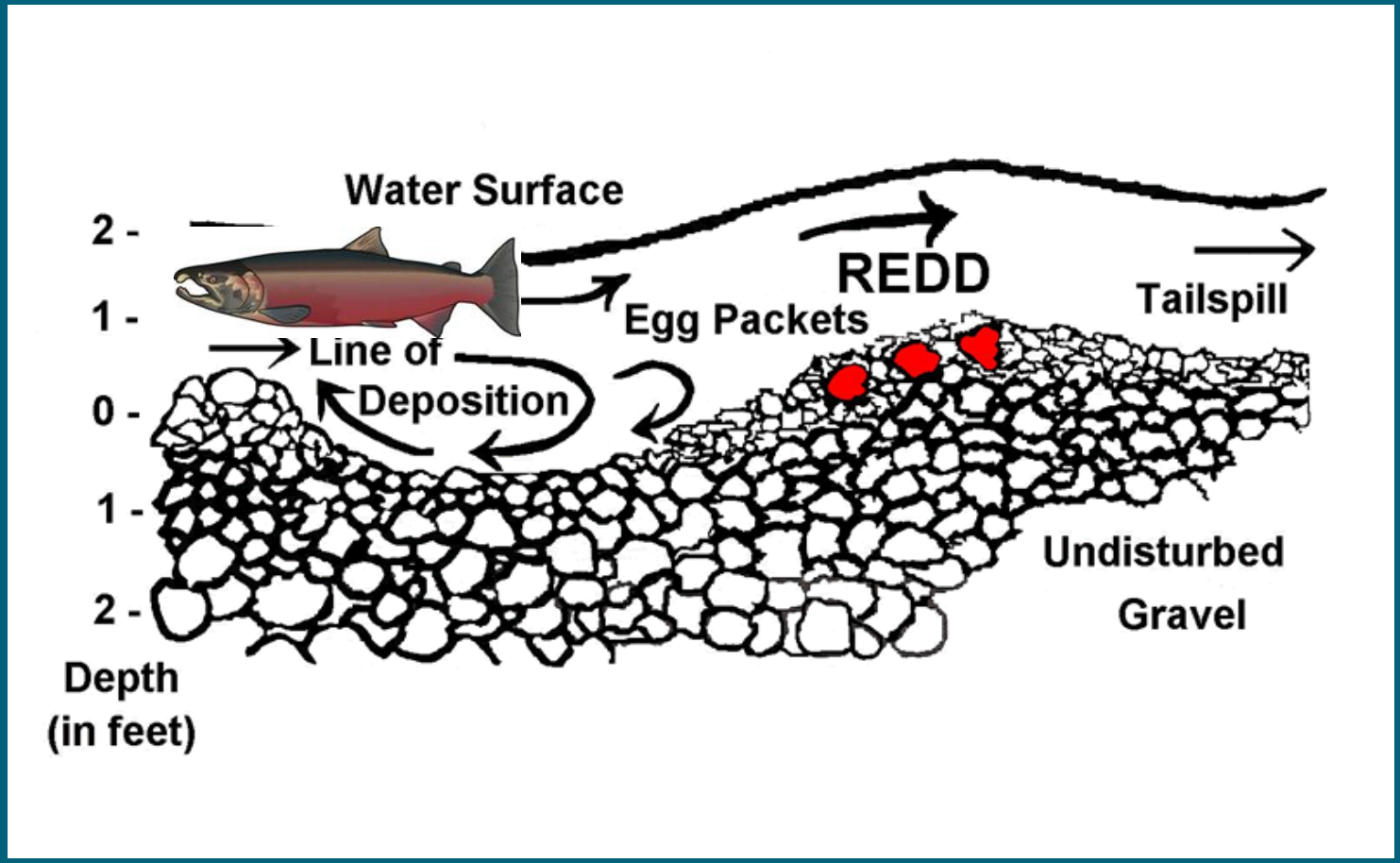
Possible new redds - HANG FLAG ABOVE REDD, with date, species and REDD written in perm. marker (note #, reach location, species only for flagging that YOUR team placed): 2 redds lower miller unknown species

Dead Adult Fish — Fish ID# and Location	Species	Fork Length (cm)	POH (cm)	Fish Girth (cm)	Ad Fin? (Y/N)	Sex (M/F)	% Egg Retention (dead females) 0-50	% Egg Retention (dead females) 50-100	Spawning Condition PSM	Spawning Condition POST	Spawning Condition UNK	Predated? Y/N	Snout Collected? Y/N	Notes (reach location, extent of any signs of predation, etc.) For more dead fish, see Page 2
Example: 101513_01 LwrMlr	coho	52	40	36	Y	F		X	X			N	N	Example: Below bridge 2. Full of eggs.
100317_01 LwrMlr	coho	50	37	34	N	F	X			X		N	Y	
100317_02 UprMlr	chum	72	58	42	Y	M					X	Y	N	

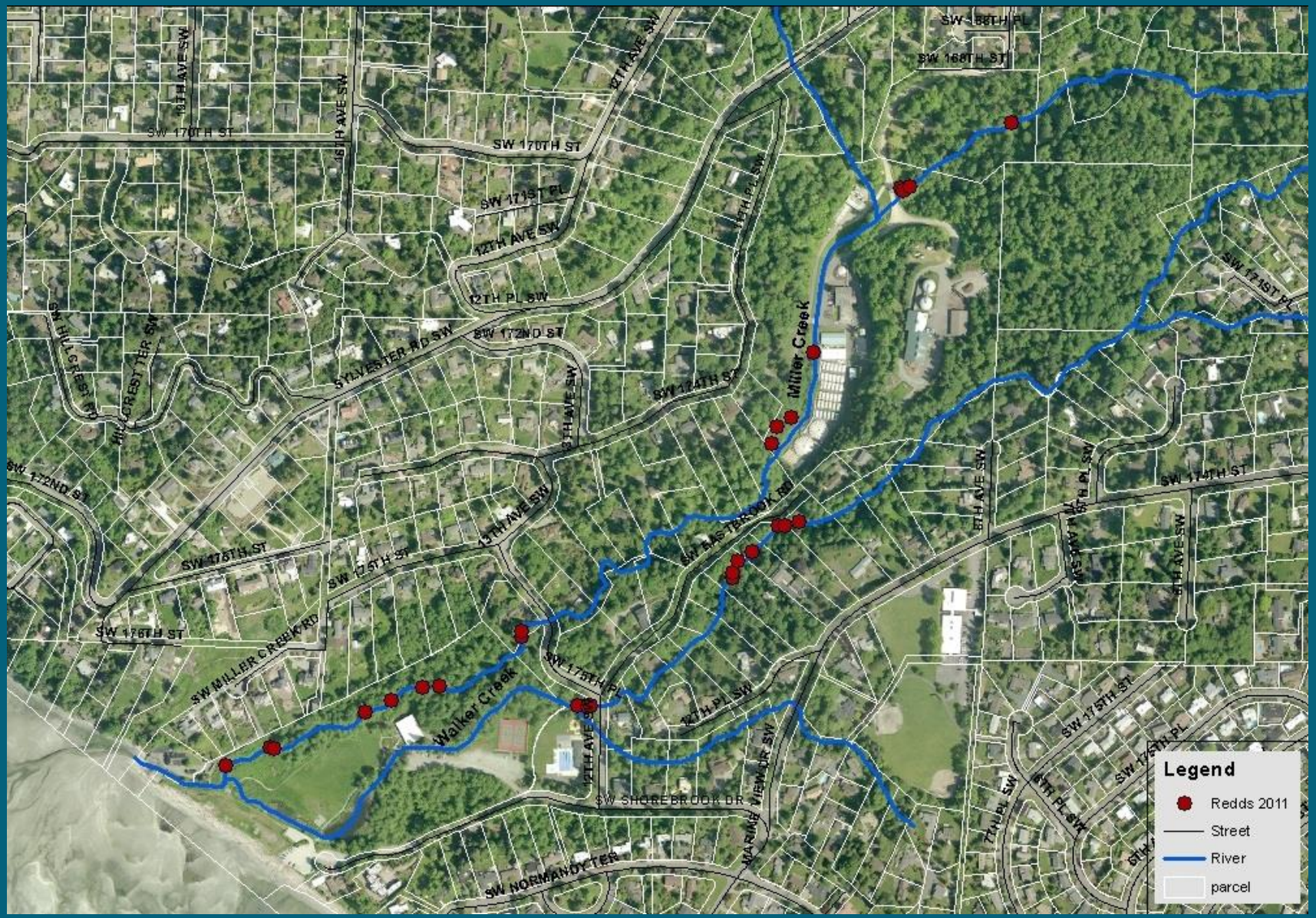
Ad = adipose fin POH = distance from back of eye to bend in tail. Location codes: LwrMlr = Lower Miller, LwrWkr = Lower Walker, UprWkr = Upper Walker, UprMlr = Upper Miller

PSM = Pre Spawn Mortality (not spawned), POST = Post spawning, UNK = unknown spawning condition. Predated = evidence that another animal bit or ate the fish. Version 9/30/2016

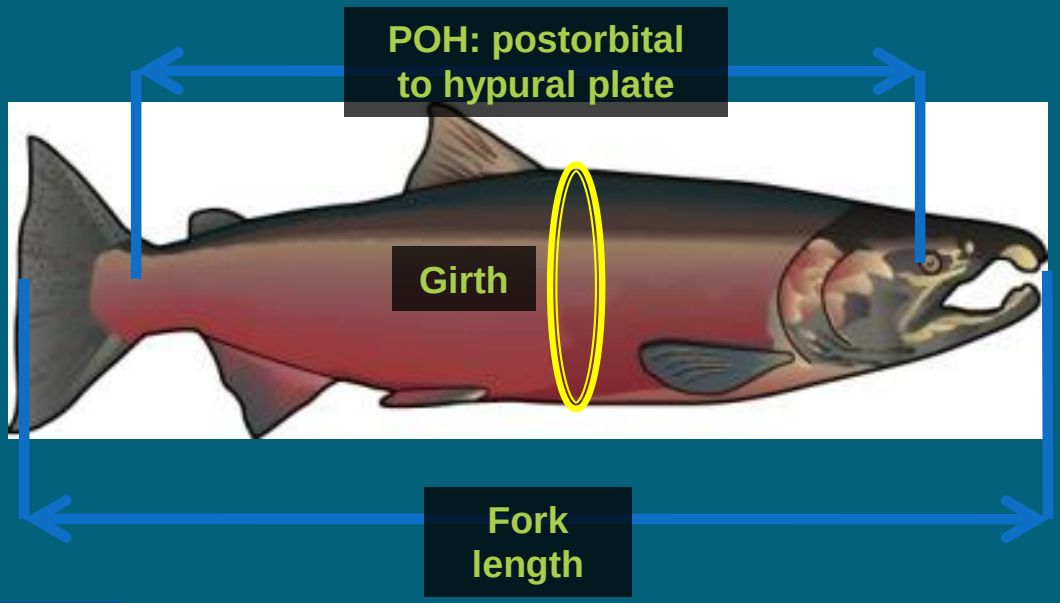
Redds


Water Surface
2 -
1 -
0 -
1 -
2 -
Depth
(in feet)
REDD
Tailspill
Egg Packets
Line of
Deposition
Undisturbed
Gravel

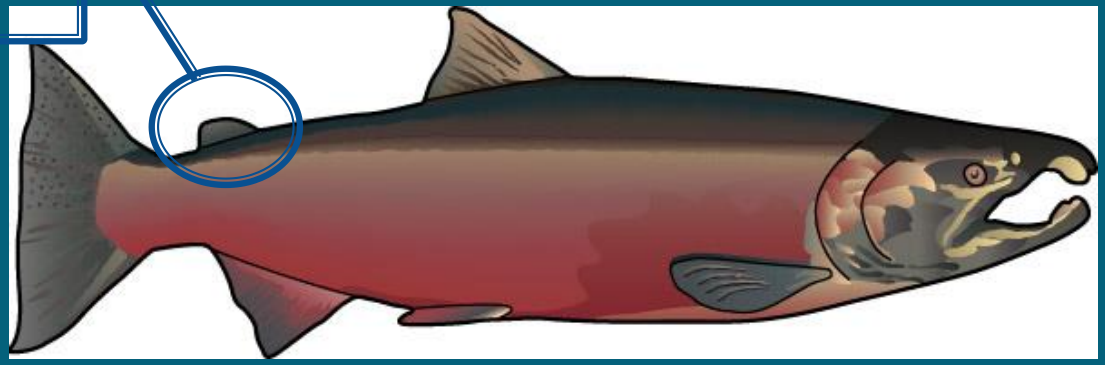
Redd Locations



Measuring Carcasses & Hatchery Origin



Adipose fin



Necropsy – Spawning conditon

“Team Tuesday” Pam cutting open the carcass to look for eggs

Photo courtesy of Pam Silimperi/Kay Larsen

Check for Pre-Spawn Mortality (PSM)

Investigating egg retention – this female spawned!

Photo by L. Moyer

Carcass Identification

Female

Male

Evidence of Predators

Predated coho carcass and raccoon tracks

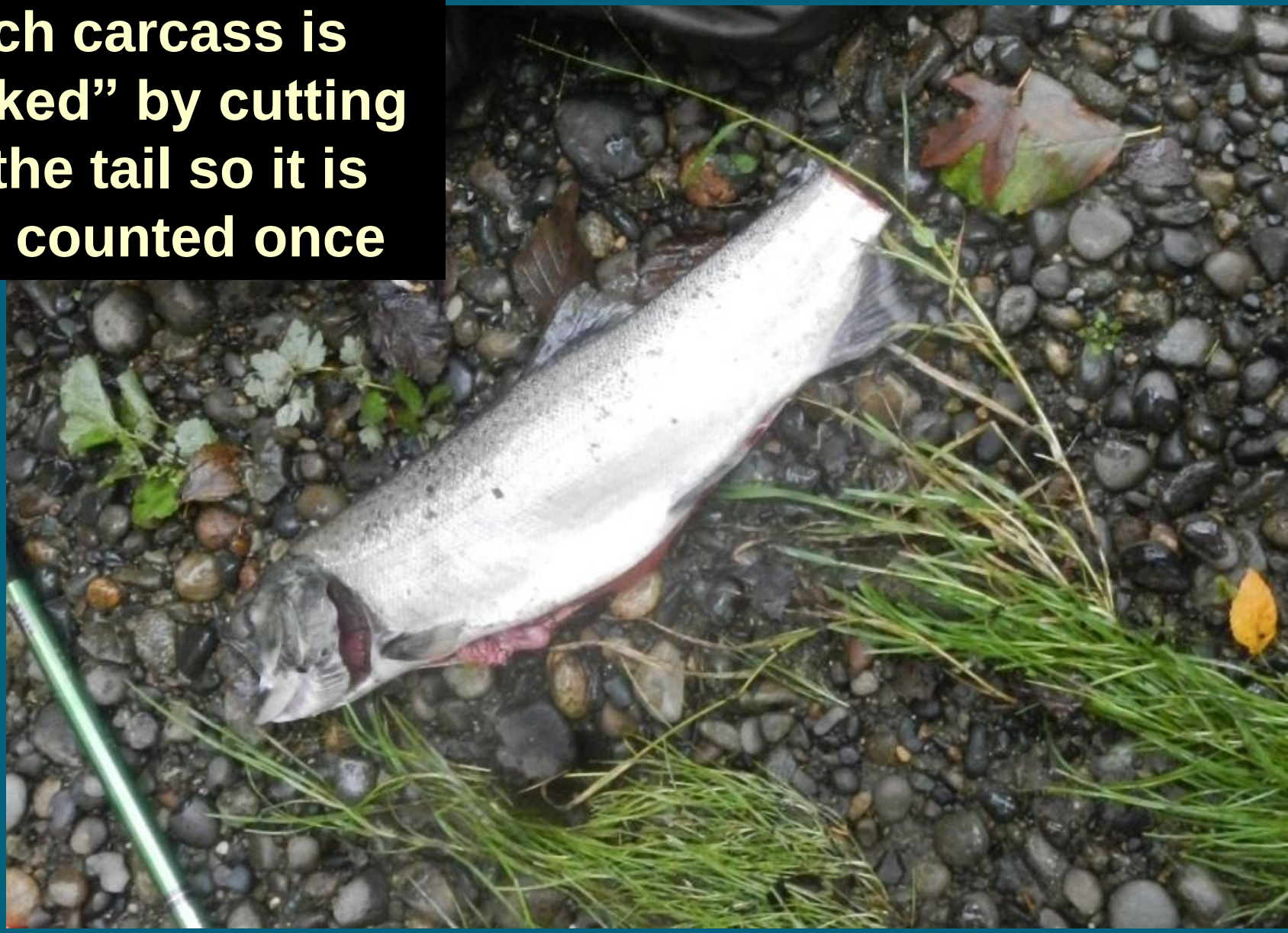
October 16, 2012

Collecting Coho Snouts for Coded Wire Tags – Bag, write ID #, note on form

Image from Alaska Department of Fish and Game

Count and Mark All Dead Fish

Each carcass is "marked" by cutting off the tail so it is only counted once

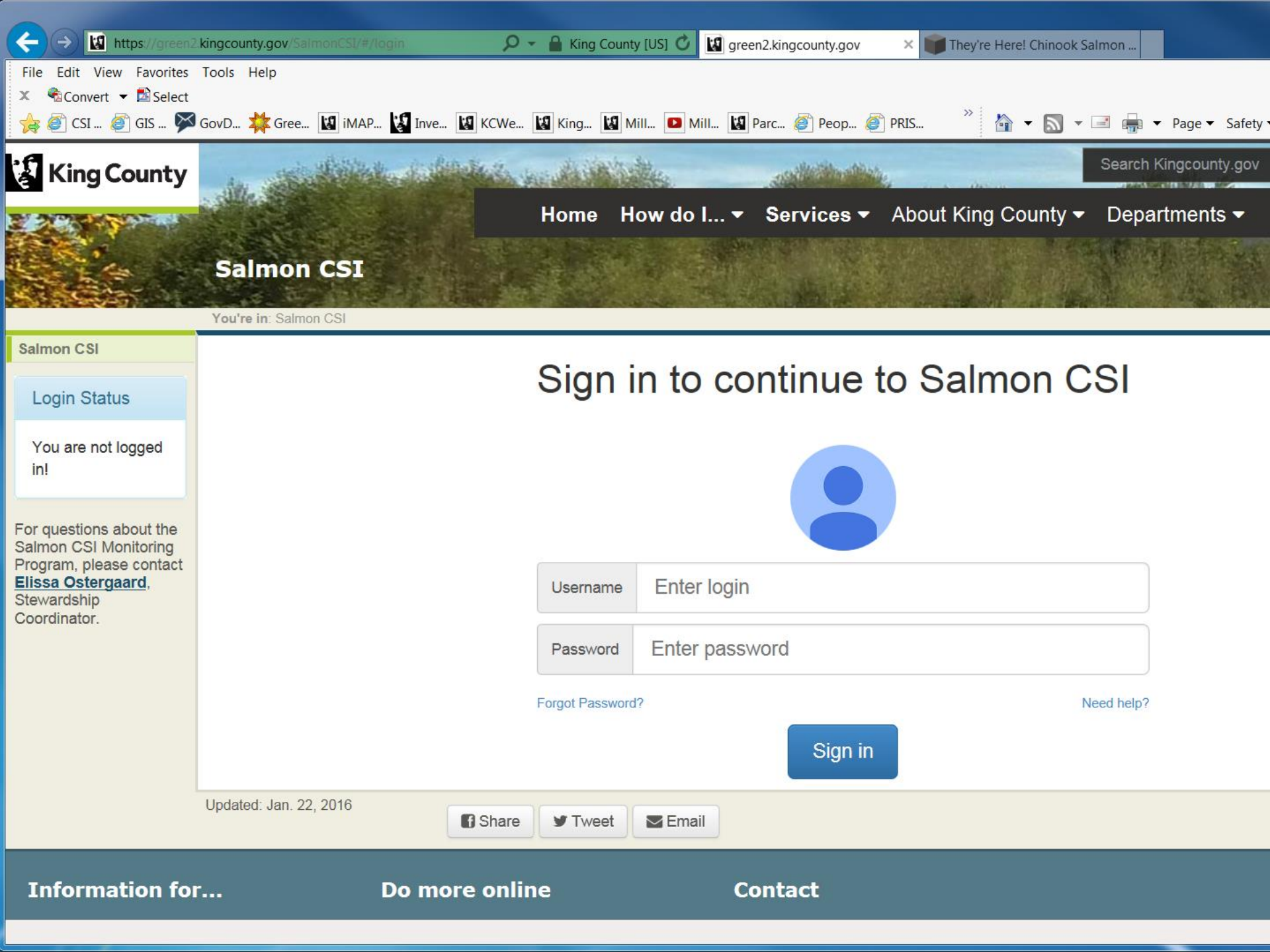


Entering Data

- Enter data into web form within **3 days** of survey:

  https://green2.kingcounty.gov/SalmonCSI

- Username & password received in email
- Save paper data sheets and turn them in at the end of the season


https://green2.kingcounty.gov/SalmonCSI/#/login
King County [US]
green2.kingcounty.gov
They're Here! Chinook Salmon ...
File Edit View Favorites Tools Help
Convert Select
CSI ... GIS ... GovD... Gree... iMAP... Inve... KCWe... King... Mill... Mill... Parc... Peop... PRIS...
Page Safety
King County
Search Kingcounty.gov
Home How do I... Services About King County Departments
Salmon CSI
You're in: Salmon CSI
Salmon CSI
Login Status
You are not logged in!
For questions about the Salmon CSI Monitoring Program, please contact Elissa Ostergaard, Stewardship Coordinator.
Sign in to continue to Salmon CSI
Username
Enter login
Password
Enter password
Forgot Password?
Need help?
Sign in
Updated: Jan. 22, 2016
Share
Tweet
Email
Information for...
Do more online
Contact

CSI Daily Survey Sheet
Search Surveys
Manage Accounts

Welcome:
Elissa Ostergaard

Log Off

For questions about the Salmon CSI Monitoring Program, please contact **Elissa Ostergaard**, Stewardship Coordinator.

Daily Survey Sheet - Community Salmon Investigation for Highline

Instructions for Use

Please fill out all sections of the form below using the following key:

POH	Distance from back of eye to bend in tail
% Egg Retention	For dead females only
PSM	Pre Spawn Mortality (not spawned)
POST	Post spawning
Predated	Evidence that another animal bit or ate the fish
*	Required field

Questions? Contact Elissa Ostergaard (206-477-4792)

Season: 2015

Date:* 10/03/2016

Start Time:* 8:00 am ?

End Time:* 10:30 am ?

Team Members:* Select — Elissa Ostergaard, Ed Nugent,

Guest Members: Guest Name

Site: ☑ Miller Creek ☑ Walker Creek

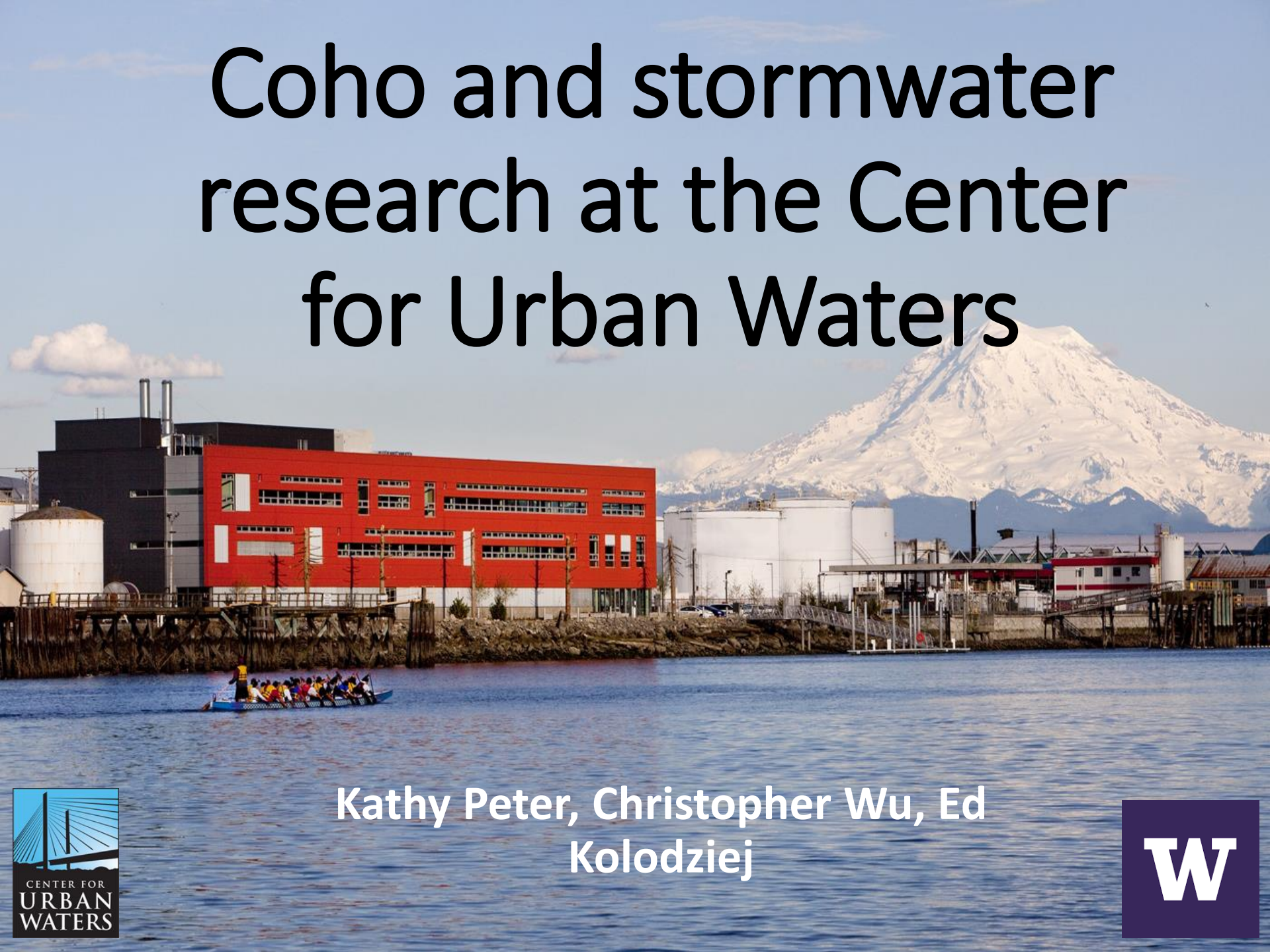
Weather:* Sunny

Water Level at Cove Beach: Level

Notes (for overall survey): Training and orientation tonight; the padlock is on the gate at the swim club as of today.

Live Adult Fish

Coho and stormwater research at the Center for Urban Waters



Kathy Peter, Christopher Wu, Ed Kolodziej

CENTER FOR URBAN WATERS

W

Stormwater quality and impacts: “Pre-spawn mortality”

Recurrent Die-Offs of Adult Coho Salmon Returning to Spawn in Puget Sound Lowland Urban Streams

Nathaniel L. Scholz[1]*, Mark S. Myers[1], Sarah G. McCarthy[2], Jana S. Labenia[1], Jenifer K. McIntyre[1], Gina M. Ylitalo[1], Linda D. Rhodes[1], Cathy A. Laetz[1], Carla M. Stehr[1], Barbara L. French[1], Bill McMillan[3], Dean Wilson[2], Laura Reed[4], Katherine D. Lynch[4], Steve Damm[5], Jay W. Davis[5], Tracy K. Collier[1]

Coho pre-spawn mortality (PSM) is widespread and recurrent in urban streams

Longfellow Creek 2003

Des Moines Creek 2004

Longfellow Creek 2005

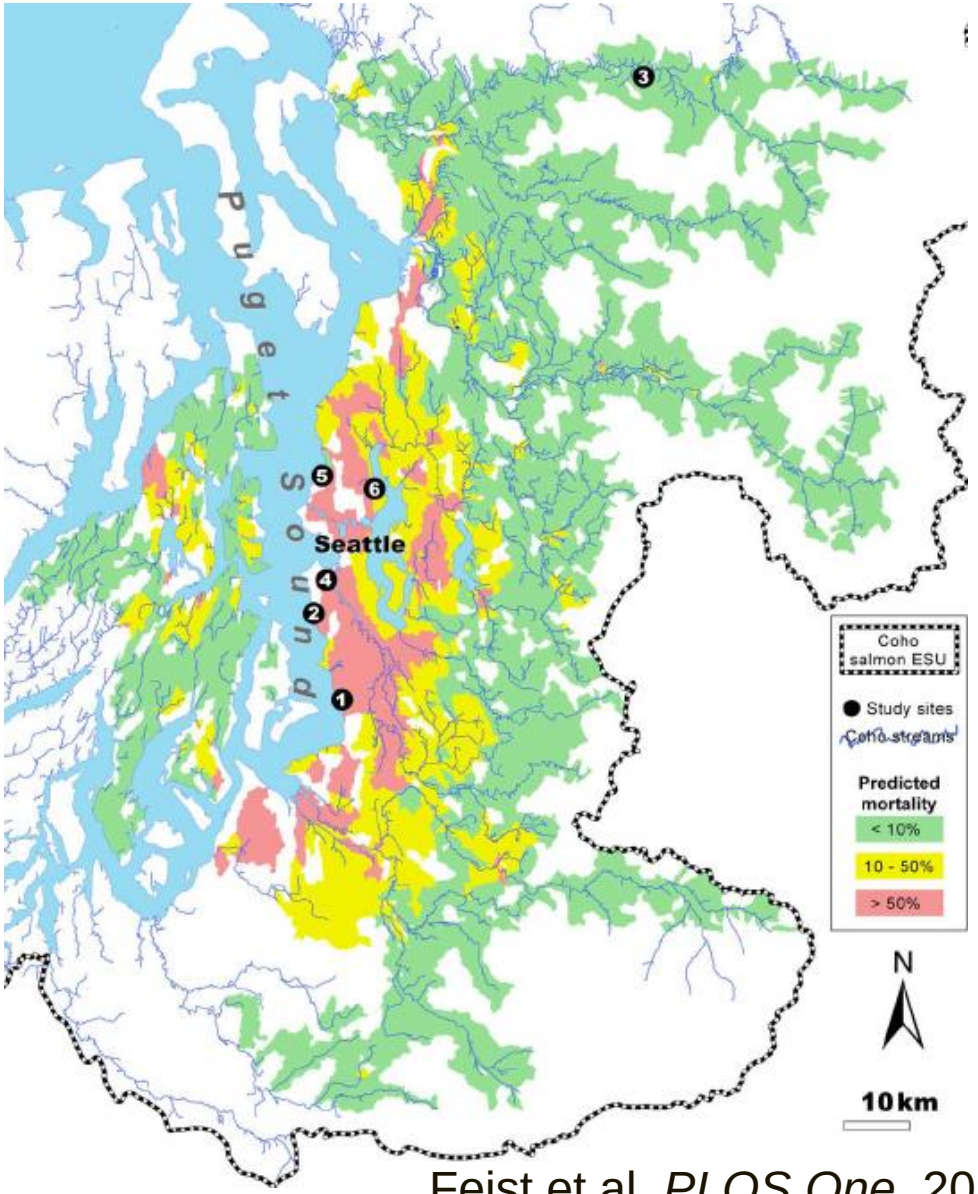
Coho PSM rates measured in Seattle-area urban streams have ranged from 40 – 90% of the total run (2002-2009)

Urban stormwater (mostly all untreated) kills adult salmon in 1-4 hrs. Why?

Cause unknown: not pathogenic, metals, pesticides, PAHs, ammonia, basic water quality parameters, etc.

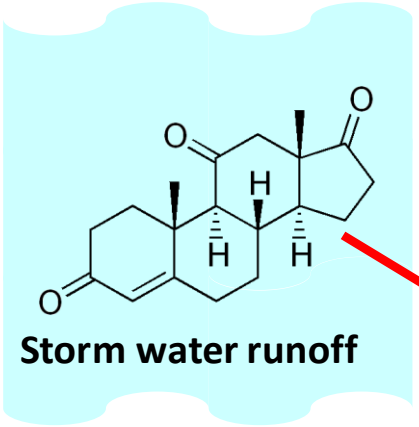
Pre-spawn mortality is linked to urbanization

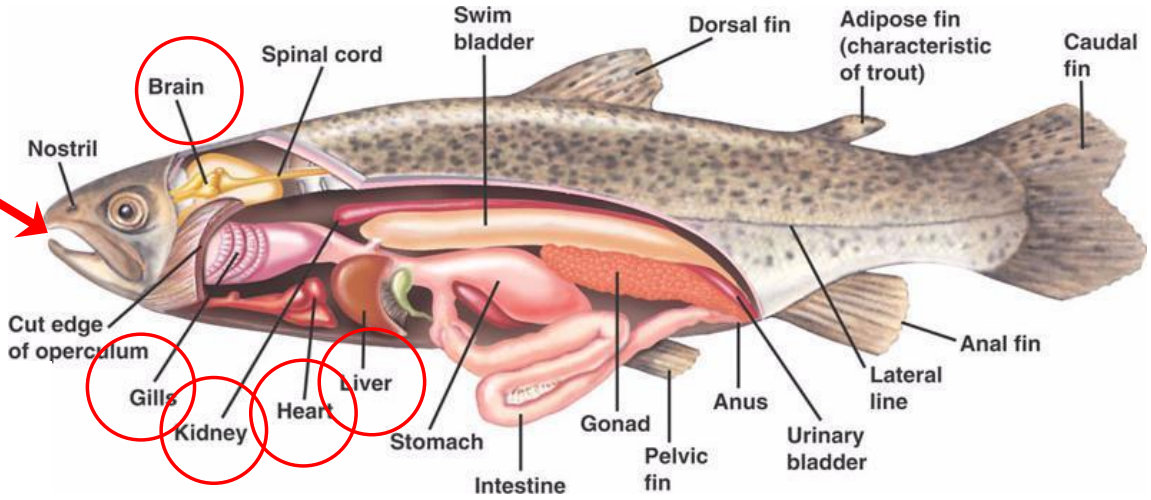
- **Toxicant(s) currently unknown; likely related to people/cars**
- **“Urbanization gradient” (land use, population density, traffic intensity, etc.) predicts coho mortality risk**



Feist et al. *PLOS One*, 2011

Our goal: Link stormwater impacts to specific chemicals





Gill → Kidney → Liver → Heart → Brain

Exposure Pathway

At CUW: using “non-target” high resolution mass spectrometry to evaluate water quality, search for toxicant(s)

“Non-target” high resolution mass spectrometry

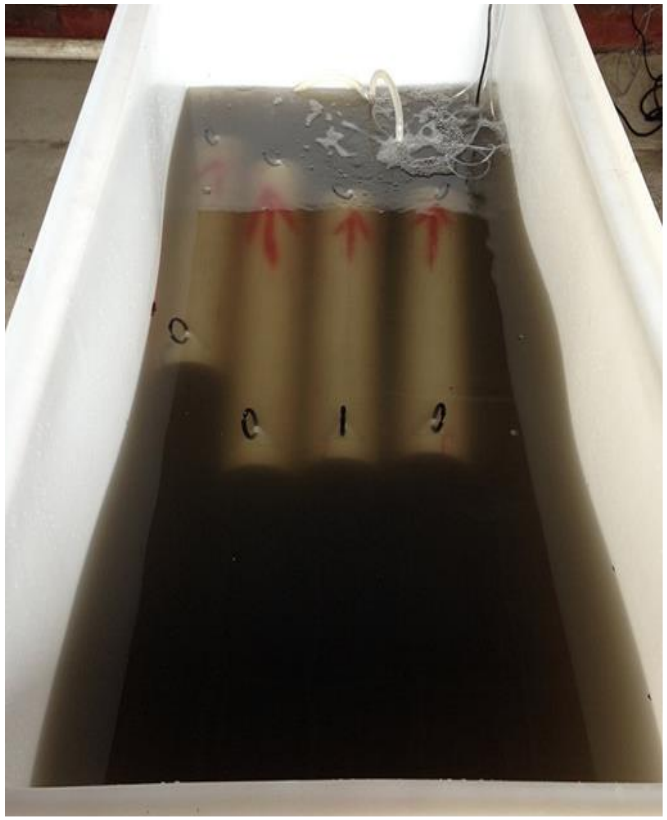
Typically: one fish (one chemical) at a time

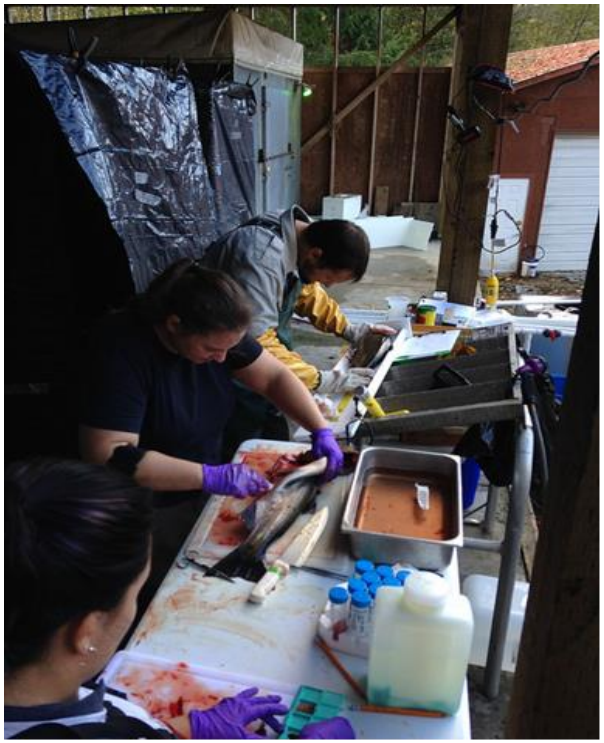
“Non-target”: capture as much as possible, then sort through for fish (chemicals) of interest

- “Forensic analytical chemistry”
- What we see: pesticides, pharmaceuticals, car/rubber-related compounds, natural products

Salmon ecotoxicology in the lab

- WSU-Puyallup, NOAA, Grover's Creek Hatchery
- Paired samples: SR 520 highway runoff vs. well water (control)





Effort to find biological mechanism of toxicity
gives us clues for forensic analytical chemistry

Salmon ecotoxicology in the field

Miller-Walker Community Salmon Investigation

(Elissa Ostergaard)

Daily volunteer surveys of urban creeks to count spawning fish, salmon redds, and document PSM

Video taken by Kristine Feldman, 10/18/2016, Miller Creek

Let us know if you see a distressed fish!

- Don’t touch the fish or enter the water
- Call Kathy, Ed, or Christopher – give us an exact location
- Stay there, take photos/videos, leave the fish in the water

Make sure you pick up a “what to do” protocol with our contact info!

Thank you!

Pre-Spawn Mortality

Salmon Identification

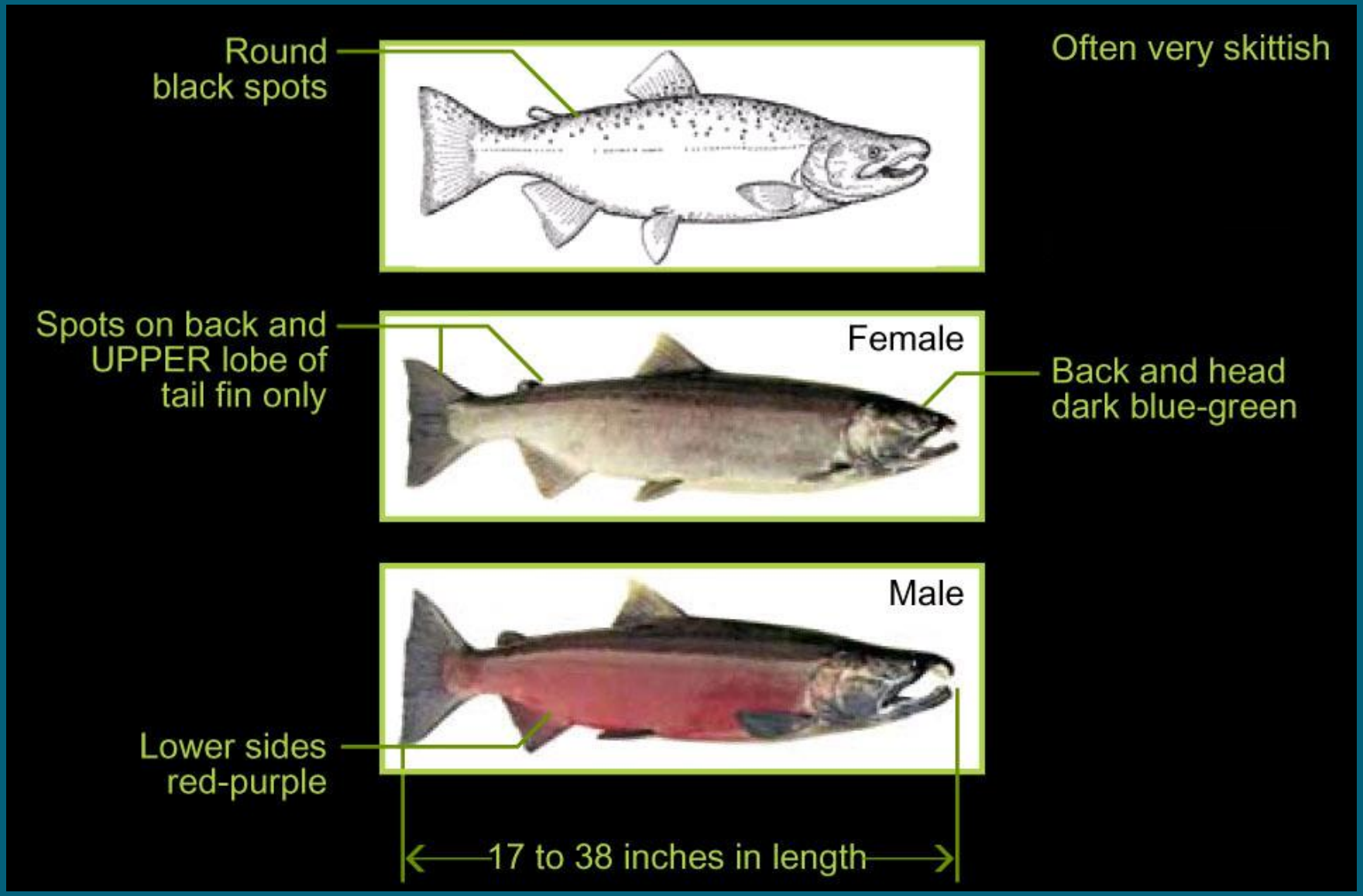
Slideshow adapted from Salmon Watcher program; developed by Jennifer Vanderhoof, King County Water and Land Resources Division

Photo by Geoff Clayton

Questions to Ask When Identifying Salmon:

1. Size
2. Spots
3. Color
4. Other behavioral characteristics

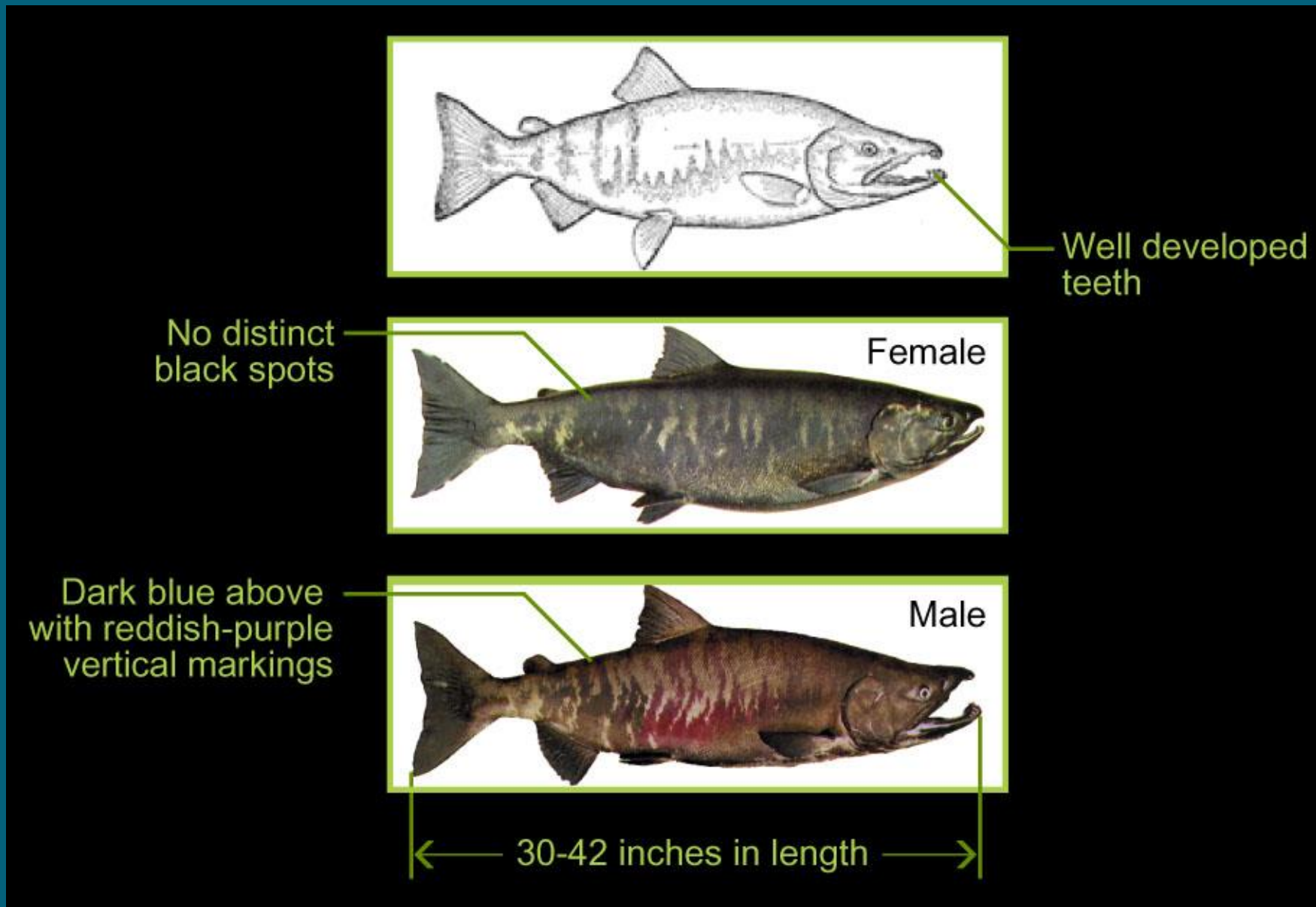
Coho
("Silvers")



Coho

Chum

("Dog", "Keta")

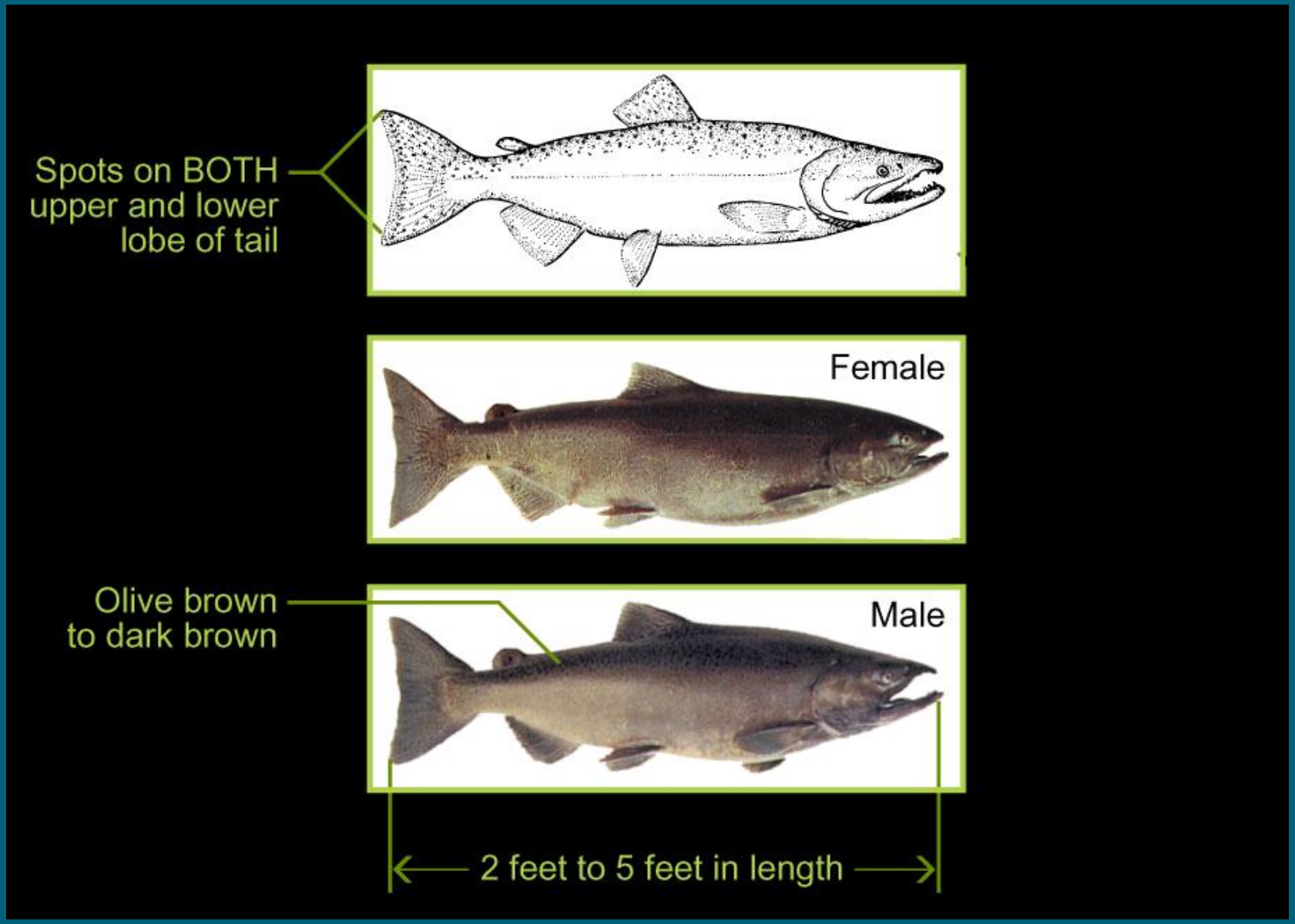


Chum

Photo courtesy of Nitinat River Hatchery, BC, Canada

Chinook

("King," "Tyee," "Blackmouth")

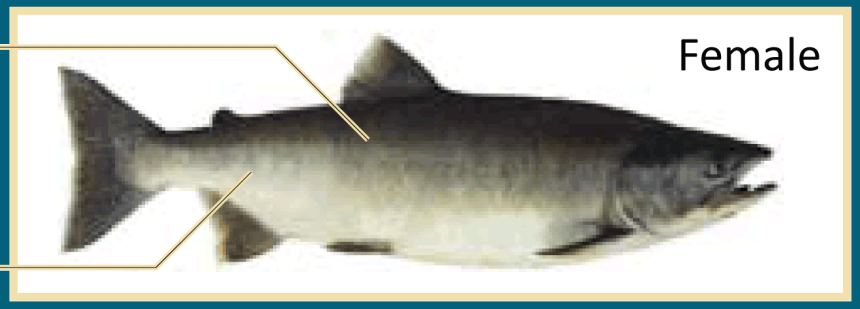


Chinook

Pink, or Humpback

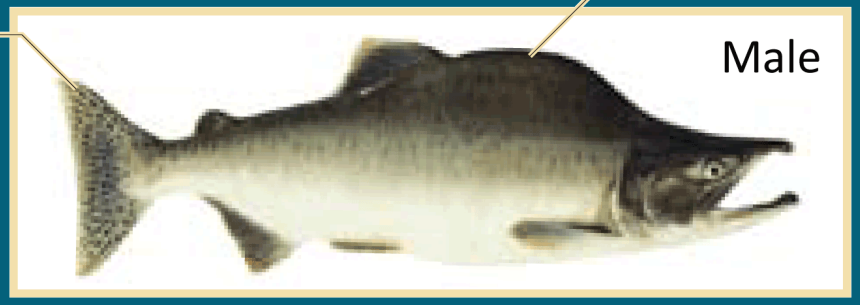
Numerous small scales

Dark band along lateral line



Only spawn in odd years (2011, 2013, etc.)

Large oval spots on back and both lobes of the tailfin



Males develop a large hump on their back (hence the nick name “Humpback” or “Humpy”)

Pink salmon spawn in central and south Puget Sound drainages ONLY in ODD numbered years

Pink Salmon

Photo E.R. Keeley

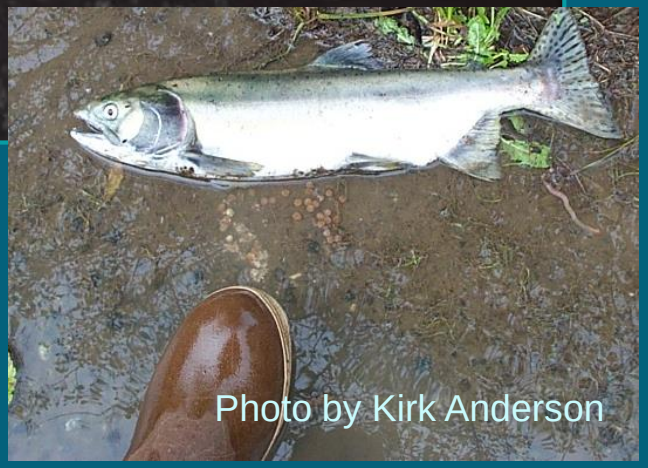
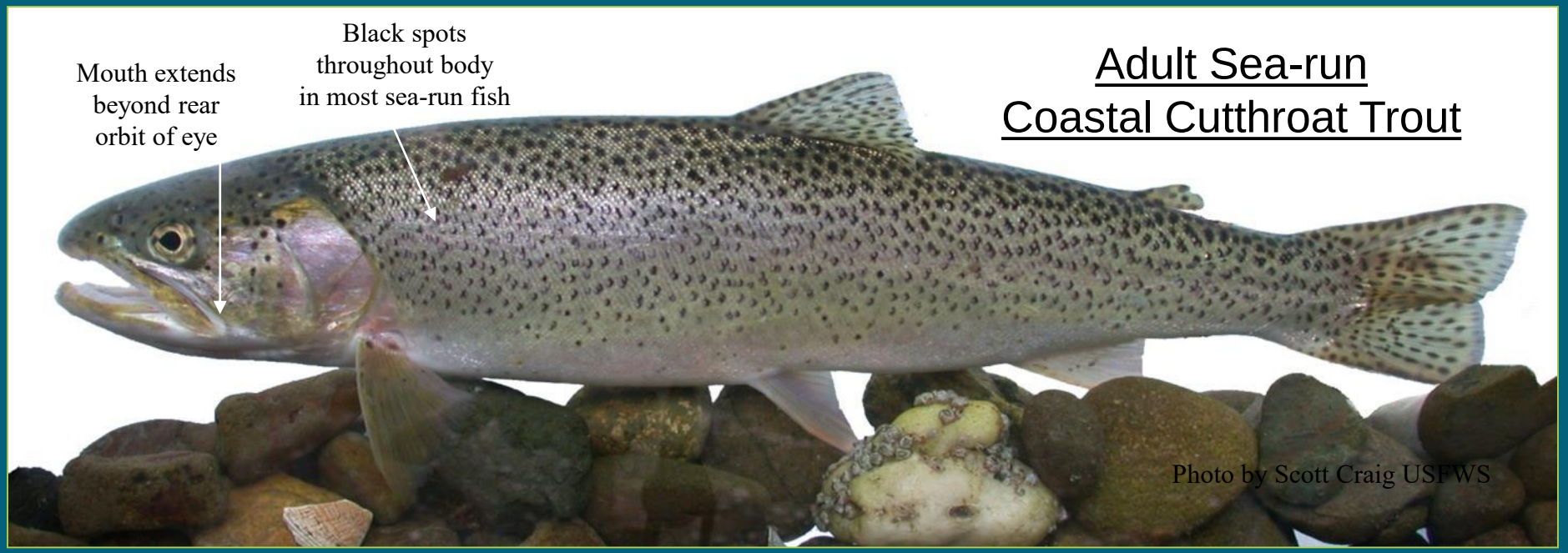


Photo by Kirk Anderson

Look at boot for scale

Cutthroat Trout

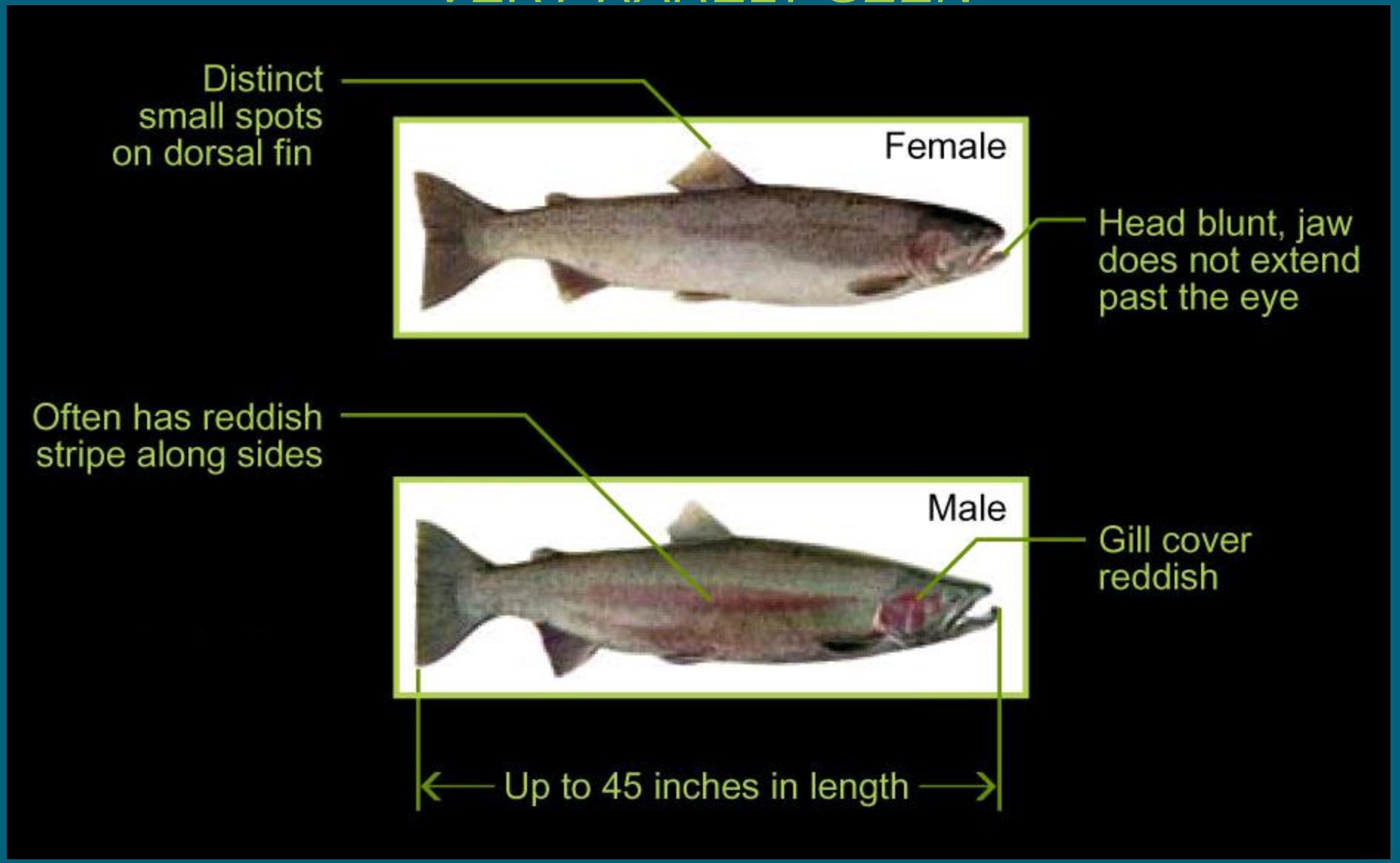


You will likely only see *juvenile* cutthroat trout. Coastal streams may see sea-run coastal cutthroat late in the season.

Length = < 16”

Photo by Rodney Hsu

Steelhead Trout: *Spawn in Winter*
VERY RARELY SEEN



		Size
Chinook		24-60"
Chum		30-42"
Coho		17-38"
Sockeye		20-28"
Pink		16-30"
Kokanee		8-22"
Cutthroat		up to 20"

Spots

Chinook		Large, splotchy, on top and bottom of tail fin
Chum		No defined spots
Coho		Small and distinct, only on top half of tail
Sockeye		No defined spots
Pink		Large, oval
Kokanee		May have small spots
Cutthroat		Numerous small spots, top & bottom

Color

Chinook		Wide color range from red to green to brown
Chum		Red/purple flame like markings
Coho		Red on belly and gill covers, green back
Sockeye		Red body, green head and tail
Pink		Green back, white belly
Kokanee		Varies red to brown
Cutthroat		silvery

Pop Quiz

Photo by Greg Brown, National Park Service

Photo by King County Staff

Photo by Chris Carrel, Friends of Hylebos Wetlands

Necropsy Practice
Ken King, USFWS

Important Tips!

- View after a rain, as soon as the water clears
- Use polarized glasses and a walking stick
- Be there before it gets too dark
- Move slowly – sudden movements or loud talking might frighten fish
- Walk lightly – on banks when possible
- Put the CSI placard on your car dashboard
- Take Pictures!

Data Collection Standards

- Enter data and turn in datasheets **within 3 days** of your survey, even when you didn't see fish. We want your data! No matter what!
- Complete datasheet and online reporting with all dates and survey times, including those when you didn't see fish.
- Mark the fish ID # and reach location on data sheets and on plastic bags with snouts.
- Always put in a fish species name. If there is a live or dead fish count, there should be a species.
- Always putting surveyors names on datasheet.

Teams & Scheduling

- Monday – Volunteers?
- Tuesday – Kristine & Liesl; Pam & Kay
- Wednesday – Lee, Craig & Terri
- Thursday – Shannon, Alexandra?, Others?
- Friday – Volunteers? Patrick P (mid Oct.)

Teams and Scheduling

- Saturday – Jim & Zack; Ashley, Chenelle & Vanessa
- Sunday – Ryan & Nick R; Katelen, Lari, & Debbie; Normandy Park Cub Scouts

- Holidays: Weds 11/11, Thurs 11/26, Fri 12/25

Teams and Scheduling

- Backup volunteers
  - Christie L. (weekdays)
  - Terri L. (weekdays after Oct. 30)
  - Mary E. (weekdays)
  - Lari D. (weds & Fri)
  - Lee M. (weekdays)
  - Barbra C. (Thurs & Fri)
  - Kerry & Matt J. (weekends)
  - Robin & Drew H. (weekends)
  - Alex K. (weekend)
  - Venessa M. (weekends after Oct 14)
  - Dahli S. (any)

Equipment Distribution

- Please fill out and turn in the liability waiver. One for EVERY surveyor.
- Team members with day assignments: pick up ONE survey kit per team and survey vests
- Backups: borrow a kit and vest or use one in the orange bucket
- Optional: knife, snips, grippy gloves
- Return your equipment clean at end of the season

Thank you for your contribution!
We couldn’t do it without you.